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1. Introduction

With the European Energy and Climate Change package in 2007, the European Union has set the mandatory and ambitious 20-20-20 targets: reducing green house gas emissions by 20%, increasing the share of renewable in energy consumption to 20% and improving energy efficiency by 20%, all by 2020. As such, energy efficiency is at the heart of the EU's 2020 Strategy for smart, sustainable and inclusive growth and the transition to a resource efficient economy in Europe. The greatest energy saving potential lies in buildings where nearly 40% of final energy consumption takes place in houses, public/private offices, shops and other buildings. Two thirds of this energy consumption is purely used for space heating with the major share of energy coming from fossil fuel sources.

By implication, in most developed countries the construction sector is the highest contributor to the emission of green house gases with an estimated average value of 33%. As a result, very low or nearly zero energy buildings with very high energy performance are crucial to reach the 20-20-20 targets. Consequently, the European Union focuses on these buildings as an important step towards achieving these goals and requires that by 2018 all new buildings must be nearly zero energy buildings in which the very low or nearly zero amount of energy will be covered to a very significant extend by renewable energy sources [1].

Nearly zero energy buildings need 80 % less energy for heating and cooling compared to conventional standards of new buildings and 90 % less energy than the existing building stock. To increase the energy efficiency by 20 % and to reduce the Greenhouse Gas Emissions by 20 % by the year 2020, the nearly zero energy buildings technology will be an essential tool on this road. At the same time, these building needs to be safe, healthy, functional and comfortable as well as aesthetically integrated into our urban fabric. Meeting all these need means coming face to face with the building sector as it stands today: highly diverse, critically fragmented and with significant inertia to change [2].

With these challenges in mind, the European Union has consistently supported research and development on low energy architecture, whilst adopting the necessary legislation: the Energy Performance of Building Directive (Recast 2010/31/EU) and the Directive on the promotion of the use of energy from renewable energy sources (Directive 2009/28/EC). Both directives focus on the key role of very low energy buildings, the involvement of the public sector, the significant building integration of high-efficiency and renewable energy systems and on the importance of guidance and training to reach the 20-20-20 targets. The directives further promote the exemplary role of the public sector, proposing to accelerate the refurbishment rate of public buildings through a binding target and to introduce energy efficiency criteria in public spending. To deploy this approach on a wider scale, the Commission proposes that public bodies should take the lead in bringing their buildings up to high energy performance and that high standards of energy efficiency should systematically be applied when public authorities purchase goods (e.g. ICT equipment), services (e.g. energy) and works (e.g. refurbishment of buildings) [1].

By 2015, new public buildings and existing public buildings that are subject to major renovation, shall adopt minimum levels of energy from renewable sources and by 2018, all new public buildings shall be nearly zero energy buildings. Energy performance certificates will be displayed in the majority of public buildings with the aim to encourage public authorities to implement the recommendations included in the certificate [2].

Member States hold the responsibility of ensuring that required guidance and training are made available to all relevant actors, notably planners and architects, who need to consider the optimal combination of renewable energy sources and high-efficiency technologies when planning, designing and building industrial and residential areas. To stimulate the transformation of buildings into nearly zero energy buildings, Member States, in cooperation with local and regional authorities, will develop, distribute and provide information of training programs as well as the benefits and practicalities of using renewable energy sources and energy efficiency technologies to the citizens.

All the above proposed actions require a well-trained workforce that is able to satisfy the growing EU market for passive houses with mature and cost efficient products. Within this environment, the CEPH Project attempted to overcome these barriers to energy efficiency buildings by providing a sufficient pool of architects and planners in various European countries with the newly established certificate as European Passive House Designers. In the following, this paper provides several strategic recommendations resulting from CEPH's implementation which are of importance in mid- and long-term perspectives for the education-, training- and construction sectors.

2. Conceptualisation and Beyond

Since the European Commission has set the task to boost the development of nearly zero energy buildings by 2015, the interest for low energy buildings has increased significantly over the last years. The concept of a low energy building is relatively new and is usually applied to smaller buildings, referring mainly to certain parts of the energy consumption within the building. Across Europe, low energy buildings are known under different names such as low energy house, high-performance house, passive house / Passivhaus, zero carbon house, zero energy house, energy savings house, energy positive house, 3-litre house. In the relevant literature additional terms such as ultra-low energy house can be found. Finally, concepts that take into account more parameters than energy demand again use special terms such as eco-building or green building [3].

In general, the term low or nearly zero energy indicates that the building has a much better and higher energy performance than standard alternative energy efficiency requirements in building codes. The European Parliament defines zero-energy buildings as those where "where, as a result of the very high level of energy efficiency of the building, the overall annual primary energy consumption is equal to or less than the energy production from renewable energy sources on site" [4]. As we become more and more aware of the surrounding fuel poverty it becomes increasingly important to reduce our dependence on fossil fuels, with fuel prices continuously on the rise the low heating demand of nearly zero energy buildings means that annual fuel costs are reduced [5].

Low-energy buildings typically use high levels of insulation, energy efficient windows, low levels of air infiltration and heat recovery ventilation to lower heating and cooling energy. To further decrease the use of heating, passive solar building design techniques or active solar technologies are applied in the buildings and heat from showers or dishwashers is recovered by a hot water heat recycling technology.

The energy requirement of a nearly zero energy buildings built to the Passive House Standard, a construction guideline developed in the early 1990s by the PassivHaus Institut Darmstadt in Germany, is:

- Annual space heating requirement of 15 kWh / (m^2 year) treated floor area
- The upper limit for total primary energy demand for space and water heating, ventilation, electricity for fans and pumps, household appliances, and lighting not exceeding 120 kWh / (m^2 year), regardless of energy source [5]

The Passive House guidelines offer a cost-efficient way of minimizing the energy demand of new buildings in accordance with the global principle of sustainability, while at the same time improving the comfort experienced by building occupants. While achieving extraordinarily low energy consumption, occupants of passive houses enjoy excellent comfort conditions and high indoor air quality during both winter and summer. The Passive House guidelines further create the basis on which it is possible to meet the remaining energy demand of new buildings completely from

renewable sources while keeping within the bounds set by the limited availability of renewable energy sources and the affordability of extra costs.

The following energy performance targets define the standard of a Passive House and must be met in order for certification as a nearly zero energy building, to be achieved:

Energy performance targets [6]

Specific Heating Demand	≤ 15 kWh/m^2. yr
Specific Cooling Demand	≤ 15 kWh/m^2. yr
Specific Heating Load	≤ 10 W/m^2
Specific Primary Energy Demand	≤ 120 kWh/m^2. yr

The passive house norms and standards mainly focus on heating, hot water, cooling, and electricity for building operation, while the total energy consumption is neglected or missing. Ideally, the minimum performance requirements should take into account all types of energy use that is:

1) demand for space heating and cooling,
2) water heating,
3) air conditioning as well as
4) overall consumption of electricity

This is often not the case. On the contrary, the definition may cover only space heating and set a maximum allowance for other energy uses such as electricity use for appliances, whilst ignoring all electricity demand that cover most heating needs for example in office buildings.

Figure 1 and 2 show example of passive houses.

Examples of Passive Houses

Figure 1: Source: Sambale / Heilergeiger architekten

Figure 2: Source: Sambale / Müller Schurr architekten

3. Workforce

Recent analysis show that the above presented intentions can only be turned into real market development when sufficient architects and engineers with profound knowledge are available all over Europe being able to cope with the specific challenges of Passive House Design and implementation. Energy efficient building solutions are technically demanding and present an immense challenge for the building and renewable energy sectors. Furthermore, it is very important to provide potential investors or housing companies with the security that the selected architect holds the required qualifications. So far, a lack of appropriate training for architects, engineers, auditors, craftsmen, technicians and installers exists. Today, about 1.1 million qualified workers are available, while it is estimated that 2.5 million will be needed by 2015 in order to meet the 20-20-20-targets. Transition to energy-efficient technologies requires new skills, environment-conscious vocational education and training in construction and in many other sectors. According to a European study, the total cost for society in case of inaction and missed investment into the training of unskilled building workforce would amount to € 33.7 billion [7]. Contrary to this sum, a calculation of the cost of training of low and medium skilled workers to be invested until 2020 would only amount to € 1.4 billion, which means that courses and programs such as CEPH amongst others could save the European society and tax-payers up to € 30 billion [7].

The European Commission is therefore launching the 'BUILD UP Skills: Sustainable Building Workforce Initiative' to support Member States in assessing training needs for the construction sector, developing strategies to meet them, and fostering effective training schemes. This will result in national strategies, roadmaps and recommendations for the certification, qualification or training needs of craftsmen. Once the first phases of implementation have been achieved, the Member States are further encouraged to adapt their professional and university training curricula to reflect the new qualification needs.

The building sector itself is a very conservative sector which requires a new prioritization of education and training needs in relation to the new developments of the sustainable low-energy construction sector. At this stage, building companies, such as SMEs, force their employees to attend training courses. This trend needs to be reversed either by making training obligatory or providing enough incentives for employees and employers to participate nation-wide.

Another factor hindering the achievement of a high amount of qualified workers within the European context is the fact that vocational education and training differ from Member State to Member State in qualification schemes, learning paths, terminologies and meanings. To reach a qualified workforce specialized on low energy building in Europe with a high degree of professional mobility within the European economic sector requires the implementation of the European Qualification Framework (EQF). This European Framework requires as a first step the creation of a National Qualification Framework within each Member State that supports the translation of learning outcomes into a common understanding on the European level. In the long-term perspective, a National Qualification Framework is also

important for making education schemes uniform. This is particularly essential for University schemes such a Bachelor or Masters degree where training courses in low or nearly zero energy building can be integrated into their vocational education or can be provided as part of their degree, leading to certification.

4. Training courses overview

This section covers an overview of training courses offered in the low-energy building and renewable energies sector offered on a European level. In the future with the implementation of the new European Building Performance Directives and in order to meet the EU's 20-20-20 targets, both sectors must work closer together.

Certified European Passive House Designer (CEPH)

The training course provides a ten day in-depth training course for architects and engineers across Europe allowing them to cope with the specific challenges of Passive House design and implementation.

For more details visit the website: www.passivehousedesigner.eu or contact:

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Pass-net

The target of the project PASS-NET is to spread the knowledge about Passive House standard within Europe and to increase the share of Passive House buildings within new buildings and the reconstruction of existing buildings. A two day training course with similar content as CEPH has been developed for the Passive House Seminar for professionals from the building sector.

For more details please visit the website: www.pass-net.net

For further information please contact: Mag. Sylvia Tanzer (sylvia.tanzer@oegut.at) or DI Gerhard Bayer (gerhard.bayer@oegut.at).

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The aim of the project is primarily to face a lack of training in the field of low energy consumption with the final objective of obtaining political commitment on massive low energy operations. Within the project, vocational training for architects, engineers and craftsmen and initial training for students of architecture and engineering are implemented. Eight seminars on low energy consumption in building have been organised including a common training kit by modules adapted for building professional stakeholders and an information campaign on high-energy efficiency in buildings by guides, brochures, events and knowledge centres.

For more details please visit the website: www.ilete.eu

Ree_trofit

The project implements training courses on Renewable Energy Solutions and Energy Efficiency in retrofitting of buildings. Three training programs have been provided for construction professionals, electrical installers and Thermo-Hydraulic Installers, addressing vocational training needs concerning energy efficient buildings retrofitting.

For more details please visite the website: www.reetrofit.eu

PVTrin

PVTrin develops and offers training and certification schemes for technicians, electricians and engineers on the installation and maintenance of small scale Photovoltaic systems. PVTrin courses run in six European countries including Greece, Bulgaria, Croatia, Cyprus, Romania and Spain. To encourage a greater number of technicians to advance their professional skills and knowledge, PVTrin provides the key components for a common qualification framework, an appropriate training methodology and a transparent and clearly defined accreditation route. All this aims at ensuring the quality of PV/BIPV installations and to defend PV's credibility from poor demonstrations.

For more information, please visit the website: http://pvtrin.gr/

Install+RES

The Install+RES training courses provide the participants with all the necessary knowledge to become an installer of small-scale renewable energy systems (biomass, solar, PV and heat pumps) in buildings. In addition,Install+RES also offers courses directed at training professional lecturers to perform high quality training courses for installers. The courses will be performed in several European countries such as Bulgaria, Greece, Italy, Poland and Slovenia.

The courses combine theoretical and practical knowledge, mainly taking place in demonstration facilities and laboratories, where practical work is performed. The qualification as an installer will encompass developed practical skills and a profound understanding of the theoretical backgrounds, ecological and economical aspects and rational use of small-scale renewable energy systems in buildings. The course will be completed with an exam leading to a certification or qualification. The examination will include a practical assessment of successfully installing biomass boilers or stoves, heat pumps, solar photovoltaic or solar thermal installations.

For more details, please visit the website: www.resinstaller.eu

5. Certification

To provide as fast as possible a sufficient pool of architects and planners in various European countries and to satisfy the growing EU market for Passive Houses, the CEPH project offered trainings leading to the newly established certificate as European Certified Passive House Designer.

CEPH training programs are offered to:

- Craftsmen, who have the permission for taking the responsibility for a house design;

- House designers with work experience, who have undergone the following types of training:

  - ✓ Studies of architecture
  - ✓ Studies of physics
  - ✓ Studies of engineering (primarily construction and heating, ventilation and air-conditioning engineers)
  - ✓ Master crafts- and tradesmen (carpenters, bricklayers, heating fitters)
  - ✓ Technicians (building construction)
  - ✓ Technicians (building services engineering)

During a ten-day intensive training course consisting of 80 hours, the participants cover all relevant issues for Passive House design. Upon successful completion of the course and passed examination, the certification of the participants as “Passive House Designers” is performed by the Passive House Institute worldwide.

A high transparency for the certification procedure and examination is ensured through its coordination through one central institute based in Germany. The Passive House Institute in Darmstadt (from now on referred to as PHI) developed the certificate named “Certified Passive House Designer” / “Certified Passive House Consultant” so that individuals may have the possibility of proving a subject related qualification in the field of particularly energy efficient construction. In order to qualify for a certificate a verified qualification in an appropriate professional field is required. A copy of this qualification must be made available to the PHI. Since there are many different trades and professions across Europe which may sometimes prove difficult to assign to one of the above categories, the final decision will be made by the training course providers. The acquired title after completing the certifying course is supplemented by a term describing the candidate’s professional qualification (e.g. “Certified Passive House Designer – Architect”, “Certified Passive House Designer – Carpenter”). Candidates who do not have a subject related qualification will obtain the title “Certified Passive House Consultant”.

The certificate is valid for five years and can be renewed by documenting a built and certified Passive House. Potential customers can find and select qualified designers via the database of certified Designers to be found on the internet. To avoid

duplication of training courses and competition among course provides within a country, CEPH interacted very closely with the variety of already existing individual projects and programs and used a synergy effect whenever necessary. Further, CEPH itself was based on a complete analysis of the national situations and is designed in a way that facilitates replication of schemes and processes to other crafts [8].

According to the certification of Passive House components and buildings, the concept for the certification of a Passive House Designer was developed in 2006 by the Passive House Institute in cooperation with eza! Energie- und Umweltzentrum Allgäu in Kempten.

The main targets of the certification of Passive House Designers are:

- A vital improvement of the qualification of architects and engineers
- Ensuring a high quality in designing, building and operation of Passive Houses

According to exam regulations the certification procedure offers two possibilities to give proof of the respective qualification:

- written exam based on the learning targets
- a built and certified Passive House

The first course with final exam for Passive House Designers took place in Kempten / Germany in 2007 organized by Energie- und Umweltzentrum Allgäu . Since 2008, courses for Passive House Designers were offered by Passivhaus Dienstleistung GmbH in Darmstadt and Energieinstitut Vorarlberg in Dornbirn, too. The course participants were deeply contended.

To become a Certified Passive House Designer, a verified qualification in an appropriate professional field is required. Candidates who do not have a subject related qualification will obtain the title “Certified Passive House Consultant”. An overview of different job description and their classification in “Designer” or “Consultant” can be found at the website www.passivhausplaner.eu.

According to the exam regulations there are two ways of obtaining the certificate. The first one is a more practical one by proofing the qualification with the documentation of a built and certified Passive House. The second way is a more theoretical way by passing the written examination given by the Passive House Institute.

The certification procedure is shown in figure 3.

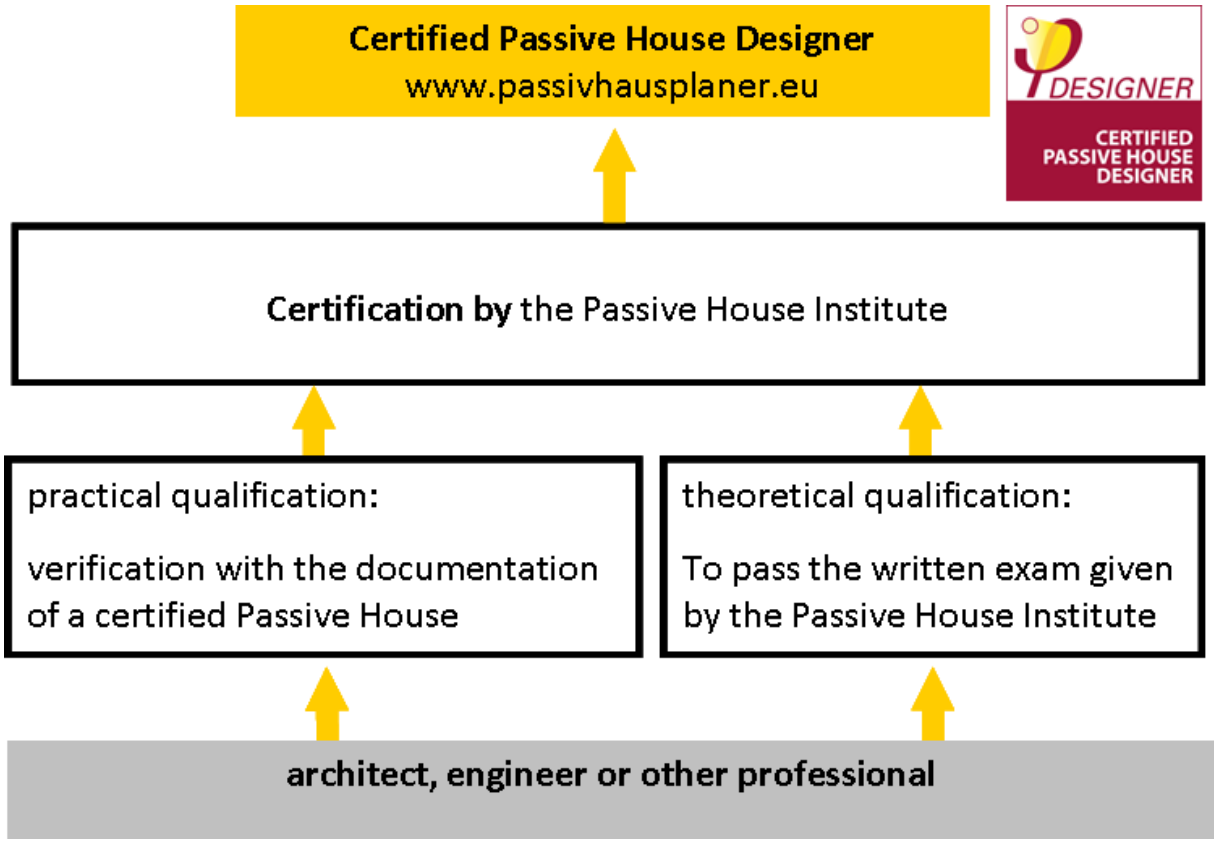

Figure 3: Overview of how to become a "Certified Passive House Designer"

The practical qualification is for those who built a Passive House already. It has to be proven that the applicant has exercised full responsibility for the project planning and design of the building. For the theoretical qualification a written exam has been compiled by the Passive House Institute. Every person with a qualification in an appropriate professional field can attend this examination. There are four examination dates every year, offered by Institutions for further education, which signed a contract with the Passive House Institute to offer these examinations.

The following figure 4 shows the two ways of getting the basic knowledge needed for designing and building a Passive House and participating in the written exam: self-study or participation in a course for Passive House Design. These courses are offered several times a year by several course providers in many different languages and countries.

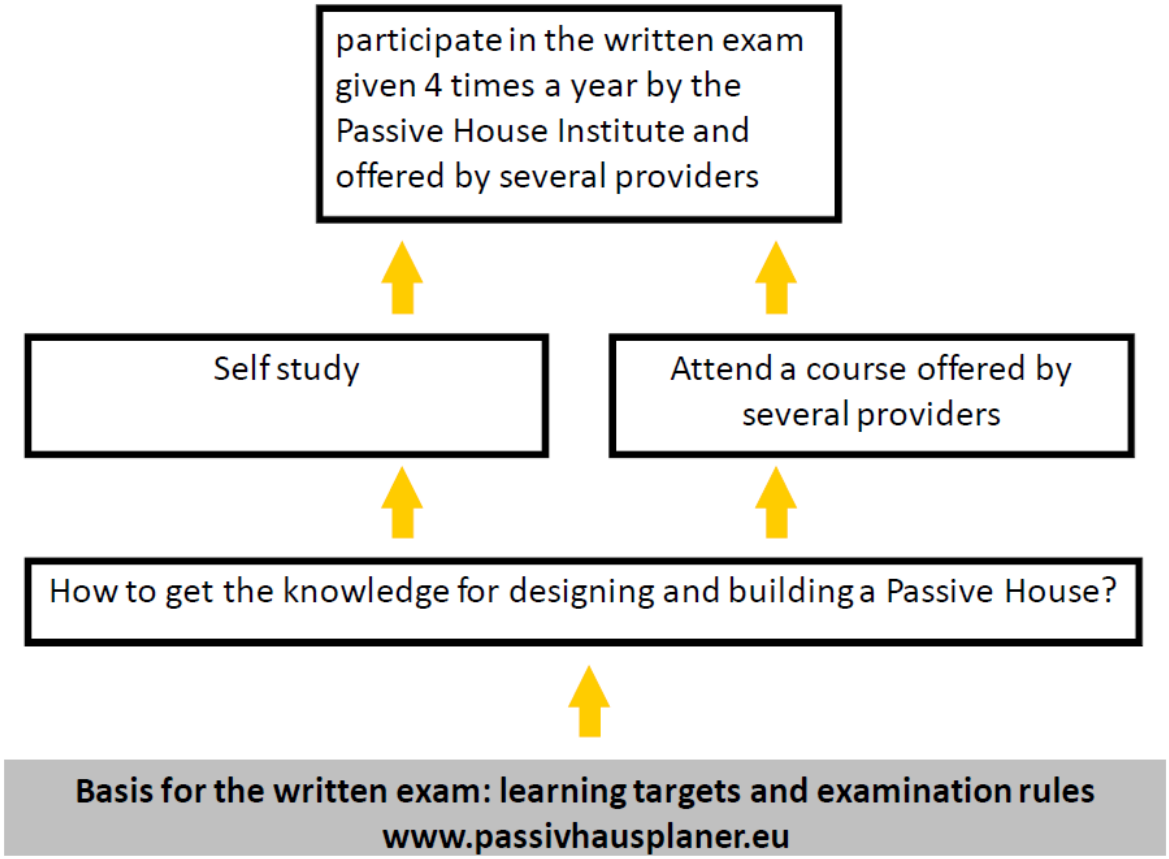

Figure 4: How to prepare for the Examination

A list of all course and examination providers as well as examination dates, examination regulations and learning targets can be found on the website: www.passivhausplaner.eu.

There is now the possibility for course providers outside the CEPH project to obtain a right of use for the materials for an own 10 day course preparing the participants for the Certified Passive House Designer exam. Figure 5 provides a screenshot of how to purchase the CEPH course material online at the CEPH website:

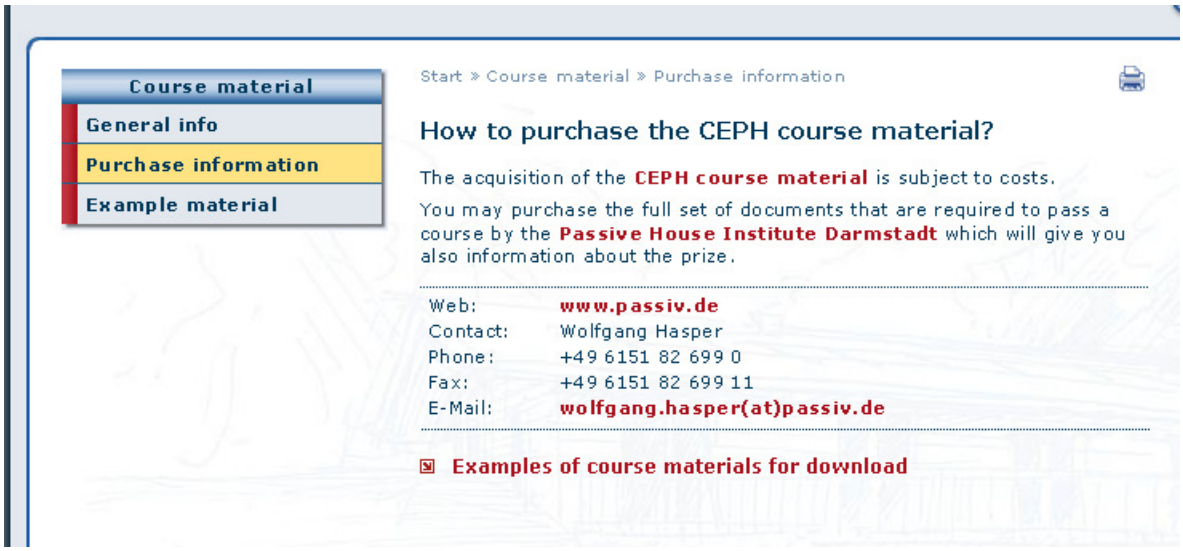

Figure 5: Screenshot of Download Shop
(source CEPH website: http://www.passivehousedesigner.eu)

In addition, several new institutions in Europe have already obtained the right of use for the CEPH training material or have declared that they intend also to take up the training material and perform courses after the completion of CEPH (Figure 6).

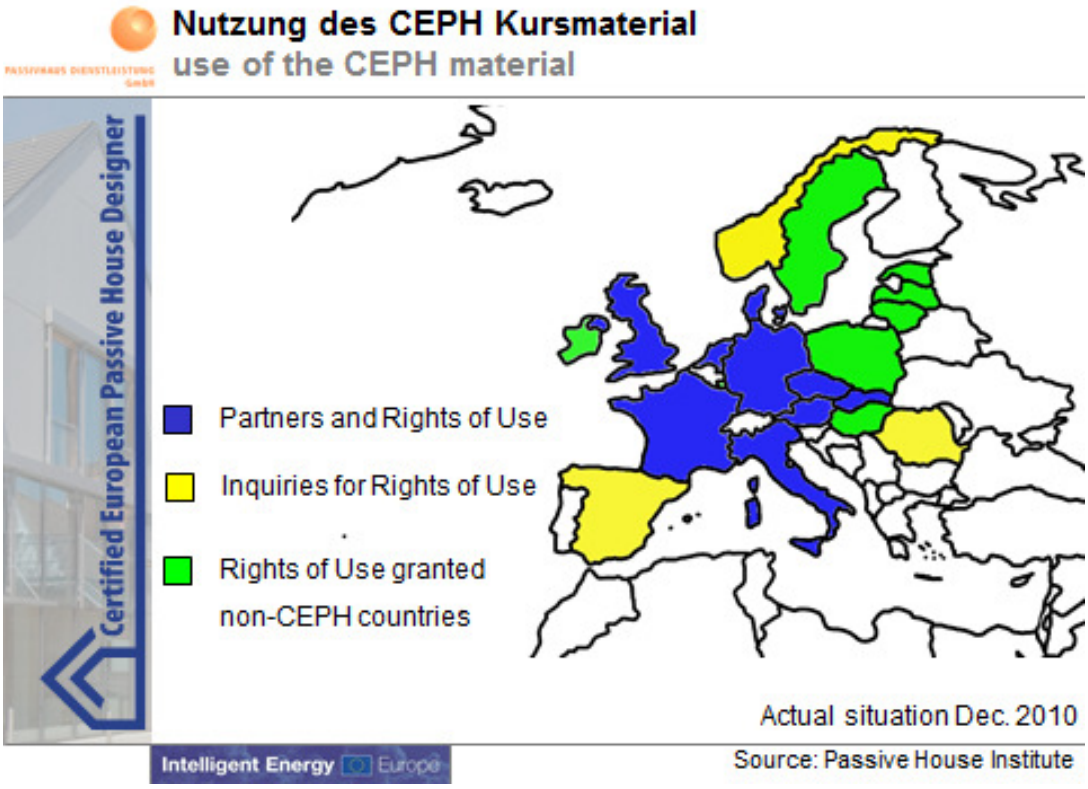

Figure 6: Right of use of the CEPH training material

6. Recommendations

Before the implementation of CEPH courses, an inventory assessment of the status of passive houses in the relevant countries has been conducted to investigate the available products, related services and available knowledge. For this, a questionnaire has been distributed to key persons within the European and International Passive House sector. It has been revealed that until 2010 at most 1250 new passive houses have been planned and 250 renovations conducted, leading to the conclusion that the number of realized and planned passive houses is still very low in Europe [9]. Based on the experience gained during the CEPH project, the consequent recommendations have been defined.

Passive House Related Services

In this regard, one important and relevant outcome of this assessment is the fact that most of the Passive-House related services are available but uncommon in the concerned Member States (Austria, Czech Republic, Denmark, France, Germany, Italy, Slovakia, United Kingdom, and The Netherlands). While the lack of available knowledge has been targeted via CEPH and other training institutions providing courses for architects, contractors and builders, the availability of other Passive House services is almost non-existing in all countries concerned.

In general, passive house services, be it advice, guidance or counselling, financial services, or passive house components are less common available and are viewed as much more expensive than common products. Knowledge based on experience or on educational and vocational training courses for architects and contractors alone is not sufficient. What is further needed is a positive influence on the demand of passive houses from regional, national or local policies or regulations. Furthermore, to tackle the financial service availability, soft loans should be provided for Nearly Zero Energy Buildings such as Passive Houses built by licensed professionals.

Incentives for the Public

Another interesting aspect for a future strategy to be taken into consideration is that the demand for passive houses comes mostly from owners. As such the consumer/owner behaviour and their interest in passive houses must be further researched in order to gain insights on what incentives need to be provided for the future. For the public to demand passive houses in advance of regulation, several demonstration sites could be built all over Europe followed by local demonstration action days and awareness campaigns. During these events, local people and professionals would be able to visit these buildings and receive answers to their questions and interests [2]. In addition to a first tightening of the building code for public buildings regarding its energy performance, some form of incentives are needed to stimulate front running passive houses. According to the Brainstorming Workshop conducted in February 2010 by leading Energy Efficiency Experts, this could be achieved by offering benefits on building rights and tax relief for energy efficiency measures and for including on-site renewable energy generation [2].

Participants to the CEPH courses

While the number of participants per course varied between 10 and 29 persons, the average number of participants during the project was 18. Most participants gave a positive feedback and appreciated the content and methods of the course as well as the enthusiasm of the teachers. Nevertheless, some respondent stated in their feedback that there might be a decreasing need for the course in the near future as certification as a passive house designer has neither legal status nor legal requirement in the country concerned. In order to sustain a high rate of participants and to increase awareness and interest in building passive houses, the legal requirements and frameworks need to change to act as incentive for architects and builders as well as for training centres offering the courses.

Furthermore, the “train the trainer” course was considered a very useful tool as it focused on the improvement of the didactic skills of the teachers as there are not many specialized teachers in Passive House Design and Construction, whereas there are many specialists on building physics and construction.

Future certification scheme

The European Directive 2009/28/EC on the promotion of the use of energy from renewable sources also states the accreditation and certification scheme for installers of small-scale renewable energy systems in buildings [10]. This EU Directive can also be a guide for preparing the certification procedure for a long-term sustainable concept for the passive house designers within the CEPH project. The certification scheme for installers of small-scale renewable energy systems in buildings should become available by the end of 2012 on the Member State level and may take into account existing schemes and structures as appropriate. In future similar certifications schemes and structures could be also asked for other sectors also involved in training such as the passive house sector.

Consequently, this accreditation and certification process should lead to a high quality certification scheme for all professionals. In order to further promote a certification or qualification within the low energy building sector, only licensed and certified professionals should be allowed to construct new public or private buildings. As mentioned above, the certificate is valid for five years and can be renewed by documenting a built and certified Passive House.

Costs

Another pertinent factor to be considered for a sustainable future of the project strategy is the costs related to the CEPH training courses in each individual country. The costs for the implementation of the CEPH project have been co-financed by the European Commission; the ideas about the future height of the course fees diverge: some respondents do not expect changes, whereas others expect the fees to be higher in future without the co-financing from the European Commission. In favour of lower fees it can be argued that lower fees may attract more participants and therefore have a positive influence on the interest in the course. In combination with

lower fees it has been suggested to shorten the course in its content to reach more architects and consultants.

Content

It is highly recommendable to be aware that most study materials reflect the central European building practice and traditions and that every training course and regulations should be adapted to National Building Requirements and traditions of each Member State. Another point that was raised during the feedback session was the importance to address social houses in the curriculum, as non-residential buildings have different standards and needs than residential buildings.

As already mentioned under the section Certification, the course should be split into "Certified European Passive House Architect" and "Certified European Passive House Consultant". Although basic knowledge is required by both target groups, consultants are focused on other aspects than architects. Specifically, the building design is of more importance for architects, whereas the heating and ventilation technology, building physics, quality control, and economics and building process are more relevant for consultants.

Continuity and Sustainability

The CEPH project ensured long-term sustainability and a continuity of the courses even after completion of the project objective. This was done by developing high quality training material, by establishing high quality level training course for trainers (Passive House Trainer Course, PHTC) and by implementing high quality level training courses for passive house designers at National level. Moreover, the sustainability of the CEPH courses was guaranteed through a variety of intranet platforms, download options, database provision, and workshops as well as information fairs. Through networking with existing course providers and established platforms in the Energy Building sector, the Certification scheme will continue. Furthermore, for a sustainable development within the Passive House Sector, projects such as CEPH need to be firmly embedded in national educational institutions such as Schools of Architecture of Universities.

To ensure the integration of the CEPH training courses into higher education it is necessary to define the learning outcomes of the CEPH training courses. This can be done through the "European Qualification Framework (EQF)". The EQF has been defined in such a way to be comparable among the European countries. This is done by identifying learning outcomes instead of learning paths. The learning outcomes are related to the knowledge, skills and competences for eight qualification levels, from basic level to expert level. The aim of the EQF is to create a common tool to be able to compare the learning outcomes among different European countries. The European Qualification Framework represents a fundamental tool to create a common understanding of learning outcomes and a reference point for the creation of National Qualification Frameworks (NQFs). The definition of learning outcomes is another necessary and essential step for ensuring the long term sustainability of the CEPH project. Indeed the definition of these learning outcomes will guarantee the integration of the CEPH training courses into higher education and therefore to the further dissemination and sustainability of the CEPH material and training courses

An interesting suggestion was to additionally establish a “European Association of Passive House Course Providers” that would meet once or twice a year to discuss relevant data and developments, to synchronize activities and to inform and discuss the national variations.

7. Conclusion

As pointed out by Commission estimates, the target set by the European Union of saving 20% of its primary energy consumption by 2020 will not be achieved at the current path. According to the Commission's most recent projections, consumption in 2020 is expected to be equivalent to a saving of only 9% [7]. On this issue, it has to be asked why so little progress has been made and how to promote energy efficiency in all its forms. These papers has outlined the lessons learned and subsequent recommendations of the CEPH project in the area of low or nearly zero energy building, such as passive house, education. If the standards of the European Commission Directives regarding the public sector regulations and its exemplary role are followed through, then CEPH has provided an important starting point for the training of the required workforce. For the future it is important to define specific outcomes as action oriented competences for the delivery of high quality in specific vocational areas. Also for the 'Certified European Passive House designer' it is important to define such common learning outcomes as a basis of a mutual accreditation of qualification and certification schemes. This could be done by taking into account the learning outcomes defined within the "European Qualification Framework (EQF)". To summarize the above mentioned recommendations, it is crucial that the certification and education of architects and contractors is followed by incentives for the public demand, by provision of services (particularly financial) and regulations as well as legal requirements regarding Certified Passive House Designers.

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